



IF0

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Smith et al.

Serial No.: 10/828,579

Filed: April 20, 2004

Cust. No.: 33123

For: **APPARATUS AND METHOD FOR
HIGH RESOLUTION IN-SITU
ILLUMINATION SOURCE
MEASUREMENT IN
PROJECTION IMAGING
SYSTEMS**

Art Unit: 2878

Examiner: Not yet assigned

CERTIFICATE OF MAILING
PURSUANT TO 37 CFR 1.8

I hereby certify that this correspondence and the attached papers are being deposited with the United States Postal Service with sufficient postage as first class mail on the date indicated below in an envelope addressed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

8/13/04
Date

Michelle Maloney
Signature

INFORMATION DISCLOSURE STATEMENT
IN ACCORDANCE WITH 37 C.F.R. §§ 1.97-1.98

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

This Information Disclosure Statement is filed prior to receipt of a First Office Action on the merits of the above-captioned application, and therefore a fee for filing this Statement should not be due. If, however, it is determined that a fee is due, then any fees that may be due in connection with filing this paper may be charged to Deposit Account No. 50-1213.

In accordance with the duty of disclosure imposed by 37 C.F.R. § 1.56 to inform the Patent Office of all material references known by Applicant or Applicants' representative, this Information Disclosure Statement prepared in accordance with 37 C.F.R. §§ 1.97-1.98 is hereby submitted. The Form PTO-1449 (1 page) is provided herewith for filing in connection with the above cited application. Any cited reference that comprise an issued U.S. patent is not attached, per the Notice of

U.S. Serial No. 10/828,579
Smith, et al.
Information Disclosure Statement
Page 2

waiver published in the Official Gazette on August 5, 2003. A copy of non-patent documents is provided, per 37 C.F.R. § 1.98(a)(2).

The document(s) cited on the Form PTO-1449 are in the English language. Hence, in accordance with the requirements of 37 C.F.R. § 1.98, as amended effective March 16, 1992, no further explanation of the listed items is necessary.

Although these documents and information are made known to the Patent and Trademark Office in compliance with Applicants' duty of disclosure, such disclosure is not to be construed as an admission by Applicants or Applicants' representative that any of the references, singly or in any combination thereof, is effective as prior art against the subject application. In accordance with 37 C.F.R. § 1.97(h), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 C.F.R. § 1.56(b) exists.

Applicants respectfully request that the Examiner review the foregoing references and request that they be made of record in the file history of the above-captioned application.

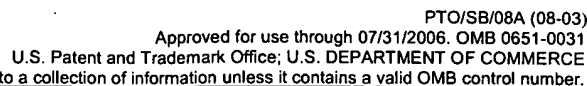
Respectfully submitted,
HELLER, EHRMAN, WHITE & McAULIFFE LLP

By: _____

David A. Hall

Registration No. 32,233

Address all correspondence to:
David A. Hall
HELLER EHRMAN WHITE & McAULIFFE LLP
4350 La Jolla Village Dr., 7th Floor
San Diego, CA 92122-1246
Telephone: (858) 450-8400
Facsimile: (858) 450-8499
EMAIL: dhall@hewm.com



Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

Complete if Known

(Use as many sheets as necessary)

Sheet	1	of	5
-------	---	----	---

Application Number	10/828,579
Filing Date	April 20, 2004
First Named Inventor	A. Smith
Art Unit	2878
Examiner Name	Not yet assigned
Attorney Docket Number	38203-6294

U. S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

[illegible]

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>		Complete if Known			
		Application Number	10/828,579		
		Filing Date	April 20, 2004		
		First Named Inventor	A. Smith		
		Art Unit	2878		
		Examiner Name	Not yet assigned		
Sheet	2	of	5	Attorney Docket Number	38203-6294

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	F	R. DeJule, "Mix-and-Match: A Necessary Choice", Semiconductor International, February 2000, pp. 66-76.	
	G	D G. Flagello et al., "Understanding Systematic and Random CD Variations Using Predictive Modelling Techniques", Proc. SPIE Vol. 3679, March 1999, pp. 162-175.	
	H	D. Cote et al., "Micrascan™ III Performance of a Third Generation, Catadioptric Step and Scan Lithographic Tool", Proc. SPIE Vol. 3051, pp. 806-816.	
	I	J. Mulken et al., "ArF Step and Scan Exposure System for 0.15 μm and 0.13 μm Technology Node?", Proc. SPIE Vol. 3679, March 1999, pp. 506-521.	
	J	M. A. van den Brink et al., "New 0.54 Aperture i-Line Wafer Stepper with Field by Field Leveling Combined with Global Alignment", Proc. SPIE Vol. 1463, 1991, pp. 709-724.	
	K	R. Rogoff et al., "Photolithography Using the Aerial™ Illuminator in a Variable NA Wafer Stepper", 1996, pp. 1-17.	
	L	J. Mulken et al., "High Throughput Wafer Steppers with Automatically Adjustable Conventional and Annular Illumination Modes", pp. 1-14.	
	M	L. Liebmann et al., "Understanding Across Chip Line Width Variation: The First Step Toward Optical Proximity Correction", Proc. SPIE Vol. 3051, 1997, pp. 124-136.	
	N	J. van Schoot et al., "0.7 NA DUV Step & Scan System for 150nm Imaging with Improved Overlay", Proc. SPIE Vol. 3679, 1999, pp. 448-456.	

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known			
		Application Number	10/828,579		
		Filing Date	April 20, 2004		
		First Named Inventor	A. Smith		
		Art Unit	2878		
		Examiner Name	Not yet assigned		
Sheet	3	of	5	Attorney Docket Number	38203-6294

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	O	H.G. Müller et al., "Large Area Fine Line Patterning by Scanning Projection Lithography", MCM Proceedings, 1994, pp. 100-104.	
	P	J.E. Bjorkholm et al., "Reduction Imaging at 14 nm Using Multilayer-coated Optics: Printing of Features Smaller than 0.1 μm", J. Vac. Sci. Technol. B8(6), pp. 1509-1513, 1990	
	Q	B.E. Newnam et al., "Development of XUV Projection Lithography at 60-80 nm", Proc. SPIE, Vol. 1671, 1992, pp. 419-436.	
	R	J. Kirk et al., "Pinholes and Pupil Fills", Microlithography World, Autumn 1997, pp. 25-28.	
	S	N. Farrar et al., "Illuminator Characterization Using In-Situ Reticle Diagnostic Structures".	
	T	N. Seong et al., "Differences of Pattern displacement Error Under Different Illumination Conditions", Proc. SPIE, Vol. 3334, 1998, pp. 868-872.	
	U	N. R. Farrar, "Effect of Off-Axis Illumination on Stepper Overlay", Proc. SPIE, Vol. 2439, 1995, pp. 273-275.	
	V	J. H. Bruning, "Optical Lithography - thirty Years and Three Orders of Magnitude", Proc. SPIE Vol. 3051, 1997, pp. 14-27.	
	W	D. G. Flagello et al., "Towards a Comprehensive Control of Full-Field Image Quality in Optical Photolithography", 1997, pp. 1-14.	
	X	J. Greeneich et al., "Advanced i-Line Illumination", Microlithography World, 1996, pp. 7-8.	

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		Complete if Known	
		Application Number	10/705,597
		Filing Date	November 10, 2003
		First Named Inventor	A. Anandakumar
		Art Unit	2133
		Examiner Name	Not yet assigned
Sheet 4 of 5	Attorney Docket Number	39908-6214	

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	Y	D. W. Peters, "The Effects of an Incorrect Condenser Lens Setup on Reduction Lens Printing Capabilities", pp. 457-463.	
	Z	N. M. Ceglio et al., "Soft X-Ray Projection Lithography", J. Vac. Sci. Technol. B 8 (6), Nov/Dec 1990, pp. 1325-1328.	
	AA	Y. Borodovsky, "Impact of Local Partial Coherence Variations on Exposure Tool Performance", Proc. SPIE, Vol. 2440, pp. 750-770.	
	AB	H. Nomura et al., "Overlay Error Due to Lens Coma and Asymmetric Illumination Dependence on Pattern Feature", Proc. SPIE Vol. 3332, pp. 199-210.	
	AC	B. Katz et al., "High Numerical Aperture I-Line Stepper".	
	AD	D. S. Goodman et al., "Condenser Aberrations in Köhler Illumination", Proc. SPIE Vol. 922, 1988, pp. 108-134.	
	AE	C. Krautschik et al., "Mathematical Treatment of Condenser Aberrations and their Impact on Linewidth Control", Final Rev, March 23, 1999, pp. 1-12.	
	AF	International Technology Roadmap for Semiconductors, 2001 Edition, Front End Process", SEMATECH, pp. 1-44.	
	AG	International Technology Roadmap for Semiconductors, 2001 Edition, Executive Summary", SEMATECH, pp. 1-58.	
	AH	International Technology Roadmap for Semiconductors, 2001 Edition, Lithography", SEMATECH, pp. 1-17.	

Examiner Signature	Date Considered
--------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>		Complete if Known	
		Application Number	10/828,579
		Filing Date	April 20, 2004
		First Named Inventor	A. Smith
		Art Unit	2878
		Examiner Name	Not yet assigned
Sheet 5 of 5	Attorney Docket Number	38203-6294	

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	AI	International Technology Roadmap for Semiconductors, 2001 Edition, Metrology", SEMATECH, pp. 1-25.	
	AJ	International Technology Roadmap for Semiconductors, 2001 Edition, Modeling and Simulation", SEMATECH, pp. 1-16.	
	AK	International Technology Roadmap for Semiconductors, 2001 Edition, Yield Enhancement", SEMATECH, pp. 1-27.	
	AL	J. E. Bjorkholm, "EUV Lithography - the Successor to Optical Lithography?", Intel Technology Journal, 1998, pp. 1-8.	
	AM	M. L. Freed, "Wafer-Mounted Sensor Arrays for Plasma Etch Processes", 2001, pp. 159.	
	AN	G. J. Swanson, "Binary Optics Technology: The Theory and Design of Multi-Level Diffractive Optical Elements", August 1989, pp. 47.	
	AO	W. Däschner et al., "General Aspheric Refractive Micro-Optics Fabricated by Optical Lithography Using a High Energy Beam Sensitive Glass Gray-Level Mask", J. Vac. Sci. Technol., B 14(6), Nov/Dec 1996, pp. 3730-3733.	
	AP	A.J. de Ruyter et al., "Examples of Illumination Source Effects on Imaging Performance", Arch Chemicals Microlithography Symposium, September 22, 2003, pp. 1-8.	
	AQ	Born et al., "Principles of Optics", 1959, pp. 524-526.	

Examiner Signature	Date Considered
--------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.